

**DEVICE FOR IMPEDING A ROUTE
OF TRAVEL OF CRAWLING ARTHROPODS**

This application claims priority from U.S. Provisional Application Serial No. 60/181,395, filed February 9, 2000.

Background of the Invention

The present invention is directed to the art of pest control, and more particularly to the art of barriers for impeding route of travel of crawling arthropods at point source, point of entry. It serves as a novel technology in integrated pest management (IPM). The invention is particularly applicable to barriers for interrupting a route of travel of crawling arthropods along passageways that lead to partially enclosed or partially exposed spaces, and may be advantageously employed in these and other environments.

Ants and other crawling arthropods pose a problem to electrical or lighting wall work boxes, pipe flanges, fluid dispensing and intake passageways, enclosed utility boxes, heating, ventilating and air conditioning ports, and other enclosed or partially enclosed vias accessible to the pests. They are also undesirable in living areas, and are known to crawl up support structures to reach beds, table tops, racks and the like.

In agricultural areas where irrigation is used, ants tend to make their way into the tiny microjets that extend from the water feed line. The ants bring sand, dirt, food and other substances with them as they enter the jets. They also leave fecal matter. The fine microjets become clogged, and the flow of water therefrom becomes interrupted such that irrigation is interrupted. The jets must then be cleaned out or replaced on a frequent basis.

In another example, crawling insects that are inside walls or utility passageways often invade interior spaces, such as residential living areas or commercial rooms, by entering through utility wall plates. This is particularly the case in warmer climates or nesting areas in all climates. It is not uncommon for ants to enter into a room via the openings for receptacles and switching outlet components

or electrical sockets. Also, if there is a gap between the wall and wall plate, the ants can foreseeably crawl through the gap into the room. They can also crawl into a room through openings defined by plates for cable wires, light switches, blank plates, and the like.

5 Pipe flanges and other articles that cover openings in walls provide another area where arthropods find access into a room or into a wall. The arthropods or ants crawl behind the flanges or plates, through pipe cracks or through pipe openings covered by flanges, or gaps between the wall and plumbing pipes.

10 Arthropods pose a serious problem for the microjets and other passageways, vias or enclosed or partially enclosed spaces attractive to such crawling insects. They clog passageways and spread diseases. They are considered a health hazard. Certain insects, such as red fire ants and Argentine ants, tend to sting humans, some to such a great extent to cause grave injury or even death. It is desirable to find a solution or an answer to these critical needs and to develop a way to prevent the 15 arthropods from entering and clogging microjets and other vias. It is further desirable to develop a procedure for eliminating or dramatically reducing the passageway of the crawling arthropods into residential as well as non-residential spaces. Finally, it is desirable to develop an implement and method to obstruct a route of travel of crawling arthropods along an exposed, enclosed, or partially enclosed passageway.

20 The present invention provides for a novel barrier implement and method for obstructing a route of travel of crawling arthropods that is safe, economical, and durable and provides a solution to the critical needs in integrated pest management.

25 **Summary of the Invention**

In accordance with the present invention, there is provided a barrier for separating ants and other crawling arthropods and vermin from a point or area where they are undesired. A method for impeding a route of travel of crawling arthropods is also provided.

30 A barrier implement intended for obstructing a route of travel of crawling arthropods along a passageway comprises a sheet material adapted to circumscribe the passageway along which arthropods crawl. A dimension of the sheet

is sized relative to the passageway. An arthropod deterring component is associated with the sheet material to deter crawling arthropods and impede their route of travel along the passageway.

A method of impeding a route of travel of crawling arthropods from a
5 location A to a location B along a passageway is also provided. A sheet is positioned between the two locations. An arthropod deterring component is associated with the sheet. The sheet circumscribes the passageway, and a dimension of the sheet is sized relative to said passageway. An arthropod impervious barrier is created between location A and location B to impede a route of travel of crawling arthropods from
10 moving from location A to location B is impeded.

A principal advantage of the present invention is that the barrier implement can be retrofit to existing standard equipment. It provides an economical solution to a widespread insect problem.

Another advantage of the present invention is that it falls within the
15 recent mandate to reduce the broadcasting of pesticide chemicals.

Another advantage of the present invention is that the barrier device serves a dual purpose. It deters a route of travel of crawling arthropods. It also reduces or eliminates the infiltration of air or drafts that flows through electrical boxes, wall plates, pipe flanges and the like.

20 Yet another advantage of the invention is found in its duration. The implement can be applied and kept in place for up to several years. After the barrier implement loses its effectiveness, a new barrier implement can be readily installed to replace the old.

Still other advantages and benefits of the invention will become apparent
25 to those skilled in the art upon a reading and understanding of the following detailed description.

Brief Description of the Drawings

The invention may take physical form in certain parts and arrangements
30 of parts, a preferred embodiment of which will be described in detail in this specification and illustrated in the accompanying drawings which form a part hereof.

Figure 1A discloses a barrier implement installed about an elongated

structure in an irrigation microjet environment;

Figure 1B provides a detailed perspective view of the barrier implement of Figure 1A in the irrigation microjet environment;

Figure 2 shows a barrier implement adapted for installation behind a utility wall receptacle, namely, an outlet wall plate;

Figure 3 shows a barrier adapted for installation behind a switch plate;

Figure 4 shows a barrier implemented for use in association with a flange;

Figure 5A sets forth an exploded view of a barrier implement situated
10 in an environment that includes a caster and a coaster disk; and

Figure 5B displays an assembled view of a caster, furniture leg and a coaster disk which holds the barrier implement in place and also provides a shield for the barrier.

Detailed Description of the Invention

Referring now to the drawings where the showings are made for the purpose of illustration only and are not for the purpose of limiting same, the Figures set forth examples of environments in which a barrier implement for impeding a route of travel of crawling arthropods is useful. The implement is useful in connection with blocking progression of arthropods crawling along passageways, whether the passageways be elongated or abbreviated in length, enclosed or exposed. The implement is designed to surround or circumscribe a given passageway such that it obstructs the crawling arthropod from proceeding between a location A and a location B along said passageway. These two locations generally comprise areas on either side of an installed barrier implement.

The barrier implement is comprised of any impregnable material or any material to which an arthropod deterring constituent could be superficially applied or impregnated. In a preferred embodiment, the sheet is comprised of a pliable polymer material into which an arthropod deterring component can be molded. But the material need not necessarily be pliable. The barrier implement can also be composed of a stiff or rigid material. The implement can be molded to be a circular, rectangular or any other shape disk, or it can be molded to virtually any configuration to fit or

conform and adapt to any virtually surface orientation. For example, the disk can be shaped as a circle, square, angular, rectangular, as a wafer, a flap, gasket, washer, sheet, plate, shelf, leaf, thimble, coat, grommet, foil, membrane or virtually any configuration. It can be flat, concave, convex or embossed. It can be molded or
5 extruded to fit any surface or embodiment to cause interruption of arthropod travel from point to point. Its purpose is to interrupt a route of crawling arthropod travel. It employs point source technology in that it stops or deters crawling arthropods at the source of the problem. It also responds to critical needs in integrated pest management.

10 An active ingredient in the nature of an arthropod deterring component is associated with the barrier material. The component can be molded directly in the barrier material, or it can be applied to the surface by painting it on or by inserting or installing a cartridge thereon. Preferably, the component is a pesticide such as permetherin which can be molded directly in the sheet. Another pesticide or other type
15 of arthropod deterring constituent, which may or may not comprise a pesticide, is contained in, applied to or molded directly in the barrier material composition. In some instances, a slippery substance, such as polytetrafluoroethylene (Teflon) coating or petroleum jelly applied to the barrier material, will suffice to deter the crawling arthropods from proceeding along the passageway. The barrier serves the purpose of
20 acting as a shield or barrier to prevent the ingress of arthropods into ports or enclosed or semi-enclosed spaces where pests are not desired, or even past certain points on flat or elongated structures.

An example of an environment where the barrier implement is useful is provided in Figures 1A and 1B. Here, the barrier implement provides a deterring effect along an elongated passageway, in this particular case an external surface of a microjet capillary. An irrigation water line 10 travels along the ground 14. The water line is shown broken away to indicate that it extends linearly in both directions. A thin diameter microjet capillary or flex tube 18 branches off the water line and is supported in a generally upward position by a stake 22 that is stationed in the ground. An upper end 24 of the stake is designed to hold or support the flex tube 18 in place. A microjet assembly 26 is in place at the distal end of the capillary or flex tube 18. Water flows from water line 10 through capillary 18 and out through an opening 28 defined in a
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head portion 30 of the assembly. It is to be understood that the microjet assembly exemplified in Figures 1A and 1B includes a threaded tube which extends downward from the head, through hex nut 32. The threaded tube is received within an internally threaded end 34 of capillary 18.

5 The removable nature of the microjet assembly enables the installation of a barrier implement 36. The barrier itself comprises a disk shaped sheet that is fashioned to enable an elongated or other type object pass therethrough. Here, the sheet is provided in a circular configuration, though virtually any configuration will suffice. The thickness of the sheet should be such that it can be accommodated in the
10 environment. The sheet disclosed in Figures 1A and 1B is less than approximately 1/16" in thickness, but this is not intended to be a limiting dimension. The sheet thickness is preferably substantially even, but is not required to be even.

15 An opening 40 defined in the sheet is adapted to circumscribe an elongated or other structure therethrough. Here, the opening is sized to accommodate the capillary tube 18. The barrier disk is held in place on the tube by passing threads from the microjet assembly through it and securing it in place by joining the assembly to the capillary and holding it in place by the pressure of the hex nut.

20 An arthropod deterring component is associated with the disk. The disk and arthropod deterring component together act as a barrier and a deterrent to prevent the crawling arthropods from passing through to the tiny microjet openings. As the arthropods crawl upward along the support member or the tube, they approach the disk. The arthropod deterring component associated with the disk deters them from continuing along their path.

25 Figure 1B shows A detailed view of the microjet assembly. Ants or other arthropods are known to crawl into the microjet opening 28 when the jets are not in use. Microjets are typically used minimally, often only once per day, in order to conserve water. When the jets are not in use, the ants crawl in through the opening to seek out moisture, particularly in dry and arid situations. They bring sand, dirt, and food with them. This clogs the microjets, which then significantly disrupts the
30 irrigation flow.

 Ants and other crawling arthropods are prevented or deterred from entering the microjets by placing a disk 36 that embodies an arthropod deterring agent

around the threads of the microjet, just below the opening 28. The disk extends to overhang the width of the capillary and is shown to rest on the top 24 of the stake 22. Ants that would have to crawl up the stake or flex tube to reach the microjet opening or port 28 are deterred by the arthropod deterring agent embodied in the disk. They 5 must encounter the disk before they can proceed to the opening.

Another example of an environment in which the vermin deterring component can be used is shown in Figure 2. It is understood that the utility wall plate environment of Figure 2 includes a wall plate 42, electrical socket 44, socket box 46 and barrier implement 48. As is traditional, the socket box is mounted inside a wall 10 and is situated to hold an electrical socket in place therein. It is understood that the outlets 49 are exposed outside the wall via openings 50 within the wall plate. Barrier sheet 48 is configured to fit within an underside of the wall plate. When installed, it is sandwiched, at least about or near its periphery, between the wall plate and a wall. The barrier sheet is configured to define openings 52 therein for receiving or exposing 15 electrical sockets therethrough. The sockets are exposed through the barrier implement and the wall plate 42.

Barrier implement shown in Figure 2 also acts as an insulator while it keeps arthropod infestation down. As will be noted, sheet 48 is designed to fit inside a utility wall plate 42 to obstruct a route of travel of crawling arthropods. In many 20 climates, there is a problem in that crawling arthropods tend to invade a room by entering through an opening made by a utility wall plate 42. The sheet defines openings 52 that correspond to openings 50 in the wall plate 42 which are adapted to receive an electrical socket therethrough.

Arthropods can also escape into a room through any gaps that are 25 formed between a wall plate and a wall. The barrier implement is designed to prevent the escape of ants or other arthropods through such gaps.

The sheet itself is configured to correspond to the size and shape of the wall plate. Generally, two opposing sides of the wall plate sheet are substantially equal in size. The sheet can be configured to agree to the shape and purpose of the wall 30 plate. For example, the wall plate shown in Figure 2 is designed to cover a double electrical outlet. If there were two additional outlets under the plate, then the sheet would be designed to include those added outlets by including two additional holes.

A similar situation is identified in Figure 3 where a light switch 54 is shown. It is understood that this environment includes a switchplate 55, the switch 54, socket box 56 and barrier implement 58. The socket box 56 is recessed inside a wall and is adapted to hold the switch therein. It is understood that the toggle switch 57 is exposed outside the wall via opening 58 in the switchplate. The barrier implement 58 is configured to fit within an underside of the switchplate and, during installation, is at least sandwiched between the switchplate and the wall. A periphery of the barrier 58 and portions inward therefrom is mounted flush to a wall. Opening 59 is defined in the switchplate barrier 58 to receive or expose the toggle switch 57 therethrough.

The barrier implement can be configured to virtually any shape or size. Another example of a useful barrier is shown in Figure 4. A barrier implement 60 is adapted to fit between a flange 62 and wall 64. By way of example, a pipe 66 is shown as extending outward from said wall. Crawling arthropods that seek to enter a room by any gaps left by an installed pipe or conduit or the like are impeded by placement of the ring-shaped disk 60 behind the flange 62. Gaps are often left between an opening in a wall 68 and a pipe or conduit. The disk is a sheet of material impregnated with an arthropod deterring component to interrupt a route of travel of the crawling arthropods from within a wall or behind a wall into a room.

Barrier implements can be configured to correspond to other types of flanges including those from conduit, cable, dryer units and the like.

The barrier of Figures 2, 3 and 4 serves an added benefit in that it reduces or eliminates drafts or air flow through openings in walls which are not adequately, insulated by pipes or flanges. After a time, the barrier implement can be recharged with a deterring component, or it can be easily discarded and replaced.

Another useful environment for the barrier implement is shown in Figures 5A and 5B. Here, a leg 70 supported by a caster 72 is shown. A coaster disk 74 defines an opening 75 for receipt of the leg therethrough. The leg can be for furniture or movable storage racks and all units supported by casters, where crawling insects are a problem. These include racks used in health care, food storage, laboratories or any other rolling structure supported by casters. Caster joining components 76 are received through opening 75 to position the coaster in place. The coaster acts as a receptacle for a barrier implement 78 which is clingingly or otherwise

mounted into the coaster. The barrier implement defines an opening that matches the coaster opening 75. The coaster provides a shielding function for the barrier so that when it is in place the barrier is not in plain view of persons and is not easily touched by persons. It is foreseeable that the barrier device could be installed on a leg without
5 the need for a coaster. The coaster provides one example of a shield for a barrier device. In this instance, the shield includes a barrier wall 80 with a rim 84. It is to be understood that the rim could be angled outwardly or flared, as shown, or perpendicular to the barrier wall 80. It is further understood that a return can be present at a bottom of the rim to minimize a gap between the caster and the coaster.
10 The shield is composed of an inert material. The barrier shown in Figures 5A and 5B serves to prevent arthropods from crawling along a passageway formed from furniture legs and casters.

This invention is not limited to the sheets disk shown in the Figures. Nor is it limited to the microjet, the wall plates, the flanges, or the furniture/caster environments shown in the figures. The situation shown in the figures is merely by way of example. The device of the present invention is fully adaptable to virtually any enclosed or partially enclosed area where it is desirable to eliminate ants, roaches and other crawling arthropods by stopping their route of travel from point to point. Examples of where the barrier device of the present invention can be used include
15 irrigation systems, electrical systems, heating and air conditioning systems, agricultural equipment, table or cart on legs, adjacent casters (indoors or outdoors), or any other situation where crawling pests pose a problem. The list is non-inclusive and is intended to include adaptability of the device to virtually any environment in any configuration to aid in the stopping of travel of arthropods from point to point.
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The barrier can likewise be used with virtually any fluid dispensing or intake apparatus, any conduit, any enclosed or semi enclosed area where arthropods are not desired. Examples include, but are not limited to, use in utility boxes, junction boxes, at the end of hoses, electrical conduits inside tubes, outside tubes, at HVAC ports, or virtually anywhere that arthropods may crawl. The barrier device can be of
25 virtually any configuration, and is molded to conform to the shape of the object to which it will be attached. It acts as a barrier, an exclusion device, a destruction device, blockade, impediment, or partition. It stops, kills or inhibits the route of travel
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from point to point of crawling arthropods. The device shields an enclosed or partially enclosed space from the crawling vermin. The vermin are prevented from crawling along the passageway from location A, which is defined as their source or the portion of passageway that leads from the source, to location B, which is defined as the area where arthropods are undesired or a portion of passageway which leads to that area.

5 The barrier is readily removable and can be replaced with another if the arthropod deterring constituent or active ingredient should become ineffective or depleted. In the alternative, it can have a protective cover or shield to protect against dermal contact.

10 The invention has been described with reference to the preferred embodiment. Obviously modifications and alterations will occur to others upon a reading and understanding of this specification. It is intended to include all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalent thereof.

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